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Harvesting Indigenous Knowledge for Community Development: Lessons from the Maasai Pastoralists of Narok, Kenya

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Abstract: This project was designed to determine management of small ruminant diseases among the Maasai people of Narok district. Emphasis was on establishing the status of the community's indigenous knowledge and its relevance and/or implication for use in development projects. Data collection involved direct observation, interviews with 80 farmers and 4 key informants from the research site. Findings indicate that farmers depended entirely on natural vegetation to produce small ruminants. The most common small ruminant diseases in the area were east coast fever, trypanosomosis and diarrhoeal diseases. Disease management involved use of manufactured drugs and ethno-medicine. There was also widespread use of locally made mating control devices to ensure that only desired traits were passed on. The project observes that some aspects of indegenous knowledge may be adopted in development projects, some may be adopted after validation research while some aspects of the knowledge may hinder successful project development and hence need corrective action.

Key words: Ethnomedicine, Trypanosomosis, indigenous knowledge, development maasai, small ruminants

Introduction

Different communities of the world have different ways of solving problems that affect them. Since the domestication of livestock, herders and small holders throughout the world have developed their own ways to treat their animals and protect them from the effects of disease and weather. Consequently, there exist community-relative knowledge bases that in some cases do not conform to the conventional scientific knowledge and principles (Mathias, 2004). In these communities, indigenous knowledge has its origin in what people can see and remember without the aid of microscopes, journals or the written word. People often see correlation and understand causality but where they see gaps in the process, they resort to spirituality for explanation. Indigenous knowledge is normally passed on orally from one generation to the next. Instructions are generally given in the field or home where the recipient is told what, how and when to apply the knowledge.

Many organisations dealing with development research in third world communities have always encountered challenges in implementation of development projects notably because of the ideological orientations that the individual scientists are aligned to. Some scientists still belong to the school of thought that is guided by the principle that development ideas are generated from education centres including colleges and universities while rural populations should essentially be consumers. The

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suggestion from other quarters about ideological involvement of local communities in development, to this category of scientists is a fad. On the other hand, the post modernists believe that local populations understand well about the challenges that face them and as such may hold the key to success and sustainability of development projects that target them (Atte, 1992; Barrow, 1992; Morrison *et al*., 1994). The scientists belonging to this later school of thought believe that synergy of ideas between the target populations and development scientists is the door towards success of development projects in rural populations. To be able to get relevant ideas from rural communities, there is need to carry out research into indigenous knowledge in target communities in order to bring afloat factors that could be incorporated into development projects. This is aimed at enhancing sustainability and acceptability of development projects by the locals as it is believed that with the introduction of emic ideas in development programs, the locals would perceive the programs as their own. It is now increasingly acknowledged that other people also have their own science and resource use that may be adopted in development programs to register success and sustainability.

Due to project sustainability challenges faced by our organisation viz., KARI-TRC, we decided to establish levels of local knowledge that could be borrowed from the Maasai community to realise optimisation of small ruminant production in the area during subsequent projects.

The project from which the information presented in this paper was generated was carried out among the Maasai pastoralists of Narok district of Kenya's Rift valley province in 2003. The project sought to address the following objectives:

- To identify the production system used in small ruminant farming in Narok district
- To determine the prevalence and management of trypanosomosis and other diseases affecting small ruminants in the area.
- To assess the use of veterinary drugs and ethno-medicine involved in the management of small ruminant diseases in the area.
- To establish indigenous knowledge related small ruminant production as practised by the Maasai of the research site and provide way forward for its inclusion in development projects.

The operationalization of the project involved a multi disciplinary team composing of an anthropologist, a pharmacologist, an entomologist and a veterinary scientist. This study presents findings of the anthropological component with emphasis on objectives two, three and four.

Materials and Methods

Study Area

The study was carried out in Koyaki and Lemek group ranches of Narok district. The district lies approximately between latitude 0°50' and 2°50' south and longitude 35°58' and 36°00 East. It covers an area of about 15,087 km^2. It is bordered by the international boundary of Kenya and Tanzania in the south (Fig. 1). The area supports one of the richest assemblages of wildlife in the world, including migratory wildebeest, zebra and host associated grazers, browsers and predators. The ecosystem is a premier tourist attraction in Kenya, generating revenues to the government in form of foreign exchange (Gok, 2002).

The research area was selected for the study because it was tsetse infested and a rapport had already been developed between KETRI, the institute mandated to carry out tsetse and trypanosomosis research in Kenya (now KARI-TRC) and the locals. The institute had also well established tsetse research and control activities in the district.

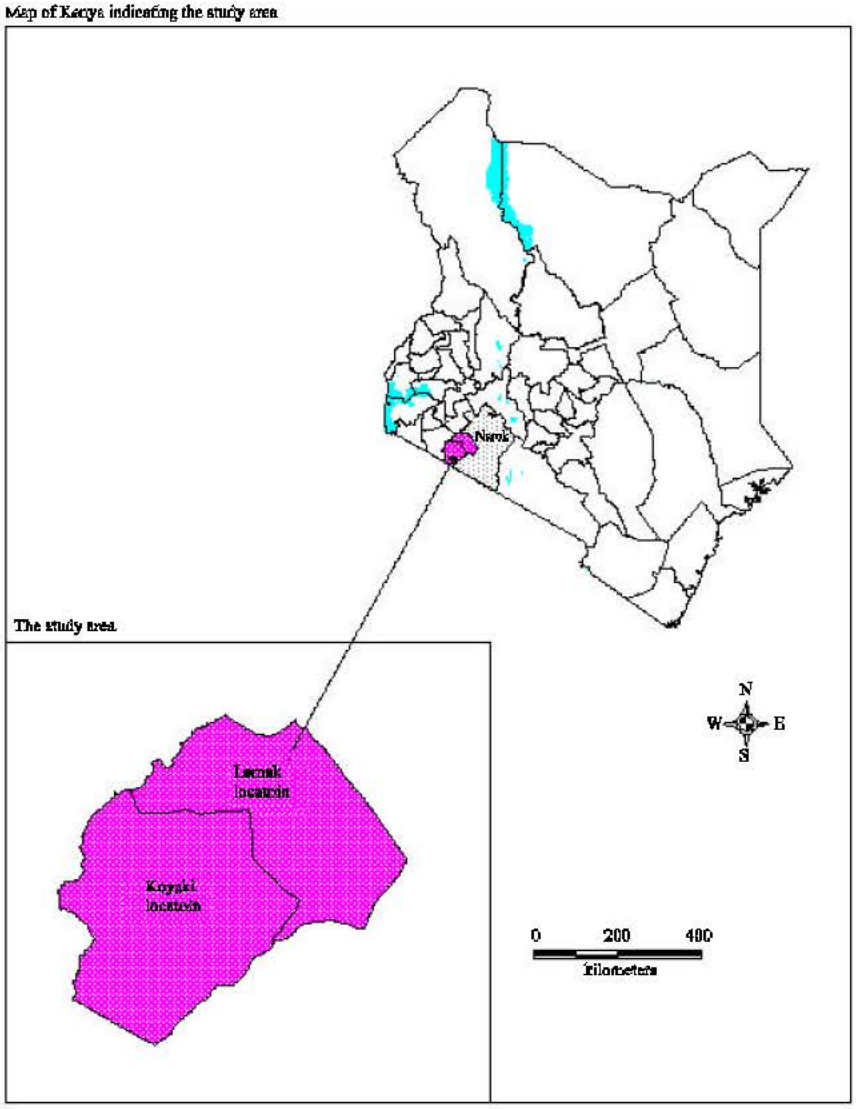

Fig. 1: Map of Kenya indicating the study area

The area is inhabited predominantly by the Purko sub-group of Maasai people. The Maasai are well known for their value of livestock and often keep large numbers of livestock mainly cattle, goats and sheep for prestige, cultural activities and survival (Galaty, 1992).

Methods of Data Collection

The principle method employed to collect data in the area was the use of a structured questionnaire. A otal of eighty respondents were interviewed. However, other methods such as key

informant interviews and direct observation were also employed. To get to the individual respondents, systematic sampling was used. Here, every second farmer was targeted for interview. Four key informants were interviewed. This was done to authenticate and gain more insights into some responses generated during questionnaire interview and direct observations that were made. The key informants were selected from farmers who were respected and perceived by other community members to be knowledgeable about small ruminant production in the area.

Results

Livestock Production

The animals reared in the research site (as observed during the study) were cattle, goats, sheep and donkeys. Cattle were grazed by young adults (mostly men) while goats and sheep were grazed by children (boys or girls of about 7-15 years of age). Donkeys could be seen either in isolated herds or grazing together with cattle. The animals were grazed in open fields with isolated bushes (Enkejo enkoiren area of Koyaki ranch) and in relatively densely forested hilly areas (Ngosuani and Emorijoi areas of Lemek group ranch). The group ranches were divided to individual farmers and 80% of the interviewed farmers got shares of between 100 and 150 acres. There were, however, no visible boundaries that demarcated the plots, animals grazed freely over a large area - depending on mutual understanding between plot owners. Manufactured feeds for either small ruminants (goats and sheep) or cattle were not given. Livestock production depended exclusively on natural vegetation. The 35 respondents had a total population of 9617 small ruminants. Sixty five percent (6251) of these animals were sheep while 35% (3366) were goats.

Livestock Diseases

Livestock diseases were the single most important constraint in small ruminant production in the area. On the importance scale, ECF (*Oltigana*), trypanosomosis (*Ntorobo*) and diarrhoea (*Nkorotik*) were labeled as the most important diseases in that order. Apart from the above diseases, respondents also pointed out other conditions that affected small ruminants. The research team did not identify the diseases and hence give them corresponding scientific names at the time.

The Table 1 shows the three most common diseases and other conditions, their local names and perceived symptoms.

The respondents also identified heartwater (*Olmilo*) to be a constraint in livestock production. However, majority (85%) believed that the disease affected cattle and not small ruminants.

Disease Management

The use of manufactured drugs for treatment of livestock diseases was wide spread among the respondents. The products bought (mostly from nearby market centres) included acaricides, antibiotics, dewormers and trypanocidal drugs. All the 80 farmers that were interviewed used antibiotics to treat ECF (*Oltikana/Malaria*). The antibiotic commonly found in the area was Oxytetracycline (Terramycine®). The monthly cost of antibiotics used by farmers ranged from between Ksh. 600 (US$.7.5) and Ksh. 4000 (US. $50). However, the cost depended on herd size. As far as disease causation is concerned, some farmers attributed occurrence of the ECF to the drinking of dirty, stagnant water by animals.

Table 1: Common diseases/conditions and their symptoms

Disease	Local name	Perceived symptoms
ECF	*Oltikan/Malaria*	Does no feed well
		Reduced movement
		Passing out a lot of mucus
		Wasting/weak
		Shivering
Trypanosomosis	*Ntorobo/Entorobo*	Swelling of lymph nodes
		Rough/standing hair
		Grows thin
		Feeds normally
Diarrhoea	*Nkorotik*	Passing out watery dung
Condition 1	*Korungonyek/enkati*	Protruding eyes
		Weak backs
		Does not get better
		Dies
Condition 2	*Orng'aang*	Animal makes a lot of noises (bleating)
		Dies fast
Condition 3	*Orikipei*	Coughing
		Passes out a lot of saliva
		Dies fast

The treatment of trypanosomosis was done using trypanocidal drugs. The drugs were easily available at market centres that were distributed in the research site. The centers became active only during market days. The commonly used trypanocidal products by brand names included Veriben®, Berenil® and Novidium®. To prepare the trypanocides for treatment, 75% of the respondents mixed with water while 25% mixed trypanocides with Antibiotics (Terramycine®). Information from key informants, however, noted that some farmers mixed Novidium® with either Berenil® or Veriben® to allegedly increase efficacy against trypanosomosis.

Diarrhoea in small ruminants was treated by Terramycine®. The other diseases notably *Korungonyek/enkati* - which was associated with wildebeests and *Orng'aang* symptomised by the small ruminant making a lot of bleating noises were believed not to have a cure. The affected animals simply died. Farmers did diagnosis and treatment of sick animals by themselves.

Treatment was commenced when an animal exhibited symptoms perceived to be for a sick animal. Administration of drugs was done daily until the symptoms disappeared. To administer the drugs to animals, farmers used varied quantities. A syringe was used to measure dosage. Most farmers (60% of those interviewed) commenced treatment when their animals lost appetite (not grazing). Ethno-medicine was also used. Extracts from *Olea africana* tree (*Mutamaywa),* were used to treat trypanosomosis in livestock especially when manufactured drugs were perceived to be not effective. Specifically, barks from the tree were boiled in water and the resultant liquid filtered and used as a solvent for granulated trypanocides such Veriben® and Berenil® and Novidium® that appears in tablet form.

Acaricides were used to control ticks in livestock. The most commonly used acaricide was Triatix® while Coopertox ® was the least used. Preparation of the acaricides was done by farmers themselves and involved diluting 3-4 bottle tops (bottle tops of packaging bottles) of the product in 20 L water. However according to Key informants, small ruminants were not sprayed individually. They were placed in an enclosed area (their *boma*) and general spraying done.

Ticks commonly found on the area, were *Rhipicephallus appendiculatus* (brown ear ticks). However a key informant noted that the most dangerous ticks were the black and white spotted ticks (*Ambylomma* spp). The farmers believed that *Ambylomma* spp are very poisonous and their bite made animals to be very thin.

Fig. 2: Sheep (Arrow indicating mating control device)

As far as helminthes control is concerned, farmers spent up to Ksh.2500 (US. $31) monthly. However, a key informant informed the research team that deworming small ruminants was not regularly done (done twice a year using dewormers of choice). Instead, farmers depended on natural salt licks, which they believed helped in worm control.

Farmers associated water points and bushes with hiding places for tsetse fly (*Ntorobo*). As far as trypanosomosis knowledge is concerned, the respondents exhibited a high degree of knowledge. This is because all the farmers interviewed were of the view that tsetse flies also transmit trypanosomosis in their livestock. However, an in-depth interview with a key informant and 20% of respondents revealed that when an animal suffered from trypanosomosis and treatment was not commenced on time or not done at all, the disease developed into another disease locally referred to as *Emunyua*. According to the informants, an animal suffering from this secondary disease, when slaughtered, had enlarged liver and infested with small worms.

Small Ruminant Management

Generally, small ruminants were grazed differently from cattle and donkeys. Children, mostly young boys and occasionally girls of about seven to twelve years of age were observed to be the ones that grazed sheep and goats in the fields. However, in some instances old men also looked after the small ruminants. There was also a strong case of desire to achieve controlled breeding especially in small ruminants. Plastic straps were tied on the bases of rams and male goats that had attained mating age but did not have desired qualities (Fig. 2). This, the respondents noted was done to prevent penetrative mating that would otherwise lead to the propagation of undesirable characteristics in the herd. The mating control device was also used to ensure that reproduction only occurred when conditions were conducive for survival of the kids and/or lambs. The straps were removed to permit mating when there was projection that the fertilised ewes would reproduce when there was plenty of vegetation cover and thus, sufficient food for the lambs. This would enhance maximisation of survival chances for the lambs.

Discussion

The Maasai depended exclusively on natural vegetation for grazing their animals. The implication is that their vulnerability to fluctuation of environmental variables is high. Extended dry environmental conditions would lead to death of livestock due to reduced forage and water (ITDG, 2004) and hence have negative consequences to the people's lives and their livelihoods. The tendency therefore was to keep large numbers of livestock possibly to safeguard against negative uncertainties. The study also revealed that the Maasai of Narok district kept more sheep than goats. The explanation given for this observed imbalance in small ruminant numbers was that sheep were valued for their animal fat, a commodity valued for its nutritional quality. The fat is abundant in sheep as compared to goats. The fat was used to prepare traditional food *(orpurda)* for mothers who had just given birth or those members of the society convalescing from various illnesses. This is indicative of the knowledge about different dietary requirements of different categories of people.

Findings also indicate that the Maasai inhabitants of the site were knowledgeable about the livestock diseases that affected their animals. The results indicate that ECF was the most important livestock disease in the area. The disease was followed by trypanosomosis and diarrhoea. The significance of this is that for development workers seeking to reduce disease burden in small ruminants should focus the three major diseases more. The identification of the diseases (ECF, Trypanosomosis and Diarrhoea) was based on observed clinical signs in livestock. This folk identification of diseases may be attributed to the long interaction of pastoralists with their environment (Kohler-Rollefson, 1996). However, assigning scientifically agreeable symptoms to livestock diseases is not peculiar to the Maasai. The same phenomenon was observed by Mugunieri and Murilla, (2003) in their study about resistance to trypanosomosis drugs at the Kenya's coast.

The respondents also identified some conditions that could not be out rightly recognised by the research team. Such conditions as *korunkonyek/enkati, orng'aang* and *orkipei* could not be scientifically recognised at the time. This reinforces the view by Mathias (2004) that ethnoveterinary disease classifications may differ from the one used in the conventional veterinary medicine. Local people may use a single term for several diseases that cause similar symptoms - though modern veterinary medicine may see them as separate diseases. However this calls for more research in the community in order to come up with a complete repertoire of livestock diseases in the area before any related project undertakings.

Heartwater, a tick borne disease for small ruminants was not associated with sheep and goats by the majority of respondents. They believed the disease-affected cattle only. This is a clear indicator that decisions should not be based exclusively on folk knowledge. Scientific validation of the knowledge is necessary before such information is incorporated into development projects.

The use of manufactured drugs for treatment of livestock diseases was widespread among the respondents. However preparation of drugs before administration involved mixing products or mixing manufactured products, especially trypanocidals with ethnomedicine. Such preparation was popular on the ground but does not enjoy scientific support. Lack of following recommended practice and farmers' diagnosis and treatment of their animals has led to resistance of diseases to drugs in many areas of the country (Mugunieri and Murilla, 2003). This means that if projects are to succeed in managing livestock diseases, adoption levels and application procedures of preceding technologies should be taken into account. This would provide an opportunity for development scientists to learn from the people's experiences with the already introduced technologies. However, in considering the role of indigenous knowledge in development, it is important to take into account both its strengths and

limitations. The strengths should be identified and developed. This is because, for ownership and sustainability of development activities in rural communities, incorporation of local knowledge into the activities by development workers is a prerequisite (Odgaard,and Maganga, 1994). There have been many cases where scientists have encountered local farmers mixing two or more manufactured drugs to allegedly increase efficacy against livestock diseases. This, therefore, indicates that, development researchers should focus their investigation on the local knowledge that is in existence at the time when research activities are carried out however bizarre such knowledge may appear to the outsider. A closer investigation of a local technique that may appear bizarre on the face value may indeed ultimately make sense and prove to have prophylactic qualities (Mesfin and Obsa, 1994; Stem, 1996; IIRR, 1994). The process of consideration for incorporation of aspects of indigenous knowledge should therefore be based on scientifically validated efficiency of th locally utilised technologies.

To a development researcher, the Narok study presents the following directions:

- That there are overt aspects of local knowledge/attitude that can be banked upon for perfection and/or adoption.
- That there are some aspects that are practiced by local populations but do not have scientific truth. Such factors call for corrective action.
- That there are some aspects that enjoy folk popularity but have not been validated scientifically. These aspects require research for validation before consideration for incorporation into development programs or discardment.

Knowledge That May Be Considered for Adoption

One of the overt aspects of local knowledge that may be incorporated into development programs, especially if one of the objectives is breed selection and/or development from herd of small ruminants, is the use of mating control devices. Farmers here may not have recognition and sustainability problems, as besides being effective it is not expensive as it involves utilization of locally available materials. Apart from being used to suppress undesirable traits and promotion of the desirable characteristics in the small ruminant herd, the technology may also be used to increase chances of survival of lamps or kids through projecting reproduction time. This is bound to ensure that reproduction takes place during seasons when vegetation cover is richest and hence more food for the animals and their offsprings. Due to this selection of beneficial traits in sheep, the Maasai have also come up with the red Maasai sheep that has been known to be hardy and comparatively resistant to helminthosis as compared to other sheep types (ITDG, 2004).

Use of manufactured products such antibiotics (Oxytetracycline®) and trypanocidal drugs (Berenil®, Veriben® and Novidium®) is not a new phenomenon among the farmers of Narok district. Development workers wishing to use this knowledge to improve on trypanosomosis management practices among these farmers may not need to grapple with intricacies involved in introduction of new technologies to rural farmers. There was also an inherent urge among the farmers of Narok district to have healthy stocks. This may provide the impetus for willingness to perfect the use of already available drugs to reduce morbidity and mortality in livestock.

Knowledge That Require Corrective Action

A researcher especially if he or she is external to the culture under study could come across aspects that may be inconsistent with his/her knowledge. However, if the researcher's position is supported by facts and if the emic view is counter productive to the very development that he/she

intends to promote then it becomes necessary for corrective measures to be instituted. During the Narok research activity, some aspects in the local knowledge that fits to be categorized as those that need corrective action were also encountered. For example, some farmers could not correctly identify the causes of east coast fever (*oltikana/malaria*). They blamed livestock drinking dirty, stagnant water for the disease. Through observation also, majority of the farmers were not so keen on controlling ticks and other ecto parasites in small ruminants. The farmers did general spraying of the small ruminants (in groups). By so doing, effective control of ticks and/or other ecto parasites can not be realized as parasites that hide at the base, under tails and ears may not be reached by the acaricides.

The continuous daily administration of drugs to perceived sick animals, as practiced by some farmers indicate there is a degree of misuse of drugs in Narok district. Different drugs have different dosage and frequency requirements. The key informant revelation that drugs used to treat trypanosomosis cases were injected to the sick animals daily till symptoms disappeared clarifies the drug misuse conclusion as trypanocidal drugs such as Berenil®, Novidium® and Veriben®, that were locally available are always single dose. This may also explain complains about resistance of the disease to the above drugs and/or other complications to the animals.

The folk belief that the appearance of worms in the liver (liver flukes) of an animal as observed after slaughter is a latter stage of trypanosomosis disease in livestock needs correction. Scientific knowledge negates affirmation that trypanosomosis and liver fluke have a causal relationship. However one contributing factor to the above folk explanation could be that in swampy areas, an important environment for one of the stages in the life cycle of liver flukes, there are always bushes and comparatively, a rich grass cover that grows around courtesy of the available water. The bushes form hiding places for tsetse flies. The likelihood that the flies bite animals when they graze or drink water near the swampy areas is an overt possibility. Swampy areas may also harbor liver flukes and hence the animals may be infected with the parasites during grazing in these areas.

Heartwater (*Olmilo*), a tick-borne disease whose prominent symptom is turning of the affected animal (animal behaving abnormally) was believed by 85% of respondents to affect only cattle, particularly calves and not small ruminants. This tick-borne disease affects all livestock and thus this view from farmers also requires corrective action for effective management of the disease. This necessitates creation of workable information channels from the scientific community to the local farmers for them also to benefit from what is scientific knowledge.

Knowledge That Require More Research

The Narok research also came up with observations whose effectiveness in livestock health needs scientific research for validation. These observations include use of natural salt licks to control worms in small ruminants. As indicated also, treatment of trypanosomosis in livestock involved use of trypanocidal drugs. These drugs included Veriben®, Berenil® and Novidium®. When farmers observed questionable efficacy during livestock treatment using any one of the above drugs, they resorted to mixing of the drugs allegedly to increase the possibility for achieving positive results. The area of effectivity as a result of mixing the products needs more research in order for appropriate advice to farmers on continued use or disuse of mixed products in the treatment of trypanosomosis to be done. The observed use of herbal medicine to allegedly break resistance of trypanosomosis to the above drugs also needs to be studied, passed through scientific validation before any recommended use as alternative medicine for the disease is made.

In conclusion therefore, the results of the study revealed that the most common small ruminant diseases in the research site were east coast fever, trypanosomosis and diarrhoeal diseases. There is

also an indication that the community has developed its own ways of managing small ruminants and associated diseases. The management procedures include both traditional and exotic techniques, either used singly or in combination. For development activities, therefore, knowledge that should be considered for incorporation into the activities should be both traditional and exotic - as practiced by the target population. Some aspects of indigenous knowledge are beneficial, some need scientific validation before incorporation in projects while some may be unproductive and harmful to development projects hence need for corrective action. Researchers should also approach local communities not as centers for knowledge to be emulated but as people who are also ready to learn from the communities. Both exotic and local technologies have their strong and weak points. The researchers should establish strengths in both technologies for a complementary incorporation in development activities.

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